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REMARKS

Claims 1-37 are pending in the present Application. No claims have been canceled or added, claim 32 has been amended, leaving Claims 1-37 for consideration upon entry of the present Amendment. Reconsideration and allowance of the claims are respectfully requested in view of the foregoing amendment and the following remarks.

Allowable Claims

Applicants wish to thank the Examiner for the indication of the allowability of Claim 37.

Claim Rejections Under 35 U.S.C. § 103(a)

Claims 1-6, 8-25, 28-30, and 32-36 stand rejected under 35 U.S.C. § 103(a), as allegedly unpatentable over Hunter (US 3,853,807) in view of Genta (US 3,923,454). Applicants respectfully traverse this rejection.

Hunter generally discloses certain azabenzanthrone and diazabenzanthrone dyes that have been found to be resistant to spontaneous high temperature degradation, and to be useful as colorants for photographic film products made by extruding a dyed polyester film base. However, Hunter does not disclose 1,8-diaminoanthraquinone derivatives having the particular purities of the instant claims, nor does Hunter teach the use of 1,8-diaminoanthraquinones in polymers other than a polyester.

Genta generally discloses anthraquinones containing phenylsulfonyl groups suitable for dyeing polyester materials and rigid plastic materials. However, Genta does not disclose the particular 1,8-diaminoanthraquinone derivatives required by the instant invention; and furthermore fails to teach the particular purities of the claimed 1,8-diaminoanthraquinones.

For an obviousness rejection to be proper, the Examiner must meet the burden of establishing a *prima facie* case of obviousness, i.e., that all elements of the invention are disclosed in the prior art; that the prior art relied upon, coupled with knowledge generally available in the art at the time of the invention, contain some suggestion or incentive that would have motivated the skilled artisan to modify a reference or combined references; and that the proposed modification of the prior art had a

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reasonable expectation of success, determined from the vantage point of the skilled artisan at the time the invention was made. *In re Fine*, 5 U.S.P.Q.2d 1596, 1598 (Fed. Cir. 1988); *In Re Wilson*, 165 U.S.P.Q. 494, 496 (C.C.P.A. 1970); *Amgen v. Chugai Pharmaceuticals Co.*, 927 U.S.P.Q.2d, 1016, 1023 (Fed. Cir. 1996).

It is the Applicants' contention that the combination of Hunter and Genta fail to render the claims obvious as Hunter and Genta, either alone or in combination, fail to disclose all elements of the instant invention; and further there is no suggestion or incentive that would have motivated the skilled artisan to modify or combine the references.

For independent claim 1, Hunter and Genta, either alone or in combination, fail to disclose all elements of the instant invention. Specifically, neither reference discloses the particular 1,8-diaminoanthraquinone derivatives having the claimed purity required by claim 1. Hunter is silent as to the purity of the few 1,8-diaminoanthraquinones disclosed therein. The compounds are merely mentioned to illustrate how poor they are for use in molten poly(ethylene terephthalate). (Hunter Column 6, line 51 to Column 8, line 1). Genta fails to disclose the particular 1,8-diaminoanthraquinone derivatives as claimed, let alone the required purity as claimed. It is noted that Genta teaches how to isolate phenylsulfonyl substituted anthraquinones from a reaction mixture. However, there is no teaching of achieving the purity profile required by the instant claims. Accordingly, as Hunter and Genta, either alone or in combination, fail to disclose all the elements of claim 1, and its dependent claims, the Applicants respectfully request reconsideration and removal of the rejection.

Additionally, there is no suggestion or incentive that would have motivated the skilled artisan to modify or combine the Hunter and Genta. The Examiner alleged that "while Hunter does not disclose the purity of the dye, it is the Examiner's position that it would have been well within the capabilities of one of ordinary skill in the art to utilize a dye with desired purity, including a purity of 90 wt% or greater." (Page 2, Office Action dated 1/30/2006). Applicants respectfully disagree for the following reasons.

Applicants respectfully maintain that the Examiner has used an improper standard in arriving at the rejection of the above claims under section 103. The correct standard is whether the cited

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references contain any suggestion or incentive that would have motivated the skilled artisan to modify a reference or combined references (*In re Fine*, 5 U.S.P.Q.2d 1596, 1598 (Fed. Cir. 1988); *In Re Wilson*, 165 U.S.P.Q. 494, 496 (C.C.P.A. 1970)), not whether it would have been within the capabilities of a skilled artisan to utilize a claimed element. In using the "within the capabilities" standard, the Applicants respectfully contend that the Examiner has improperly considered the teachings of the instant application rather than those of the references. It is respectfully suggested that in doing so, the Examiner has used the Applicants' own disclosure as a suggestion or motivation to arrive at Applicants' own invention. Such a rejection fails to provide a proper prima facie case of obviousness. (See MPEP2143.01 IV).

Neither Hunter nor Genta teaches the required purity of the particular 1,8-diaminoanthraquinone derivatives of the instant claims. In fact, neither reference even discusses the purity of diaminoanthraquinone derivatives in any way. One of ordinary skill in the art would not be motivated to modify the 1,8-diaminoanthraquinone of Hunter to a particular purity of 90 wt% or greater or to modify the 1,8-diaminoanthraquinones of Genta by removing the phenylsulfonyl group and then purifying the resulting compound to the degree required by claim 1.

Since Hunter and Genta i) fail to disclose each and every element of the instant independent claim 1 and dependent claims 2-23, 26-29, and 28-29, and ii) fail to provide a motivation to modify or combine the references, reconsideration and removal of the rejections over these claims are respectfully requested.

With regard to independent claim 24 and dependent claims 25 and 30, Hunter and Genta fail to disclose all elements of the instant invention; and furthermore fail to provide any suggestion or motivation to use the particular 1,8-diaminoanthraquinone derivatives of the instant claims. Claim 24 requires a particular combination of the specific 1,8-diaminoanthraquinone derivatives in the specific set of thermoplastic polymers to provide an article formed therefrom to have a hue angle value of less than or equal to about 330 degrees (when used at a loading of 0.01 pph at an article thickness of 3.2 mm). Hunter and Genta, alone or combined, fail to teach or suggest this particular combination. Indeed, Hunter and Genta are silent in regard to the hue angle requirement for the article. Indeed, as will be discussed in the next section, Hunter and Genta fail to suggest even the

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particular combination of 1,8-diaminoanthraquinone and polymer required by claim 24, let alone a combination that would provide the claimed hue angle value.

Hunter teaches away from using the instantly claimed 1,8-diaminoanthraquinone derivatives. This reference teaches that suitable colorants for polyesters are azabenzanthrones and diazabenzanthrones (Column 2, line 30 to Column 6, line 50), not 1,8-diaminoanthraquinone derivatives required by the instant claim. Hunter does disclose a particular 1,8-diaminoanthraquinone derivative, i.e. 1,8-bis-cyclohexyl anthraquinone (Column 7, lines 55-69). However, this dye is disclosed as one of the unsuitable dyes because it is either unstable or incompatible in polyester systems, as Hunter warns:

It is noteworthy that, whereas the azabenzanthrone and diazabenzanthrone materials described above can be generically considered to be "anthracene-derived" dyes, it is recognized that by far the greater majority of such "anthracene-type" dyes (including many anthraquinone-type dyes) are either unstable or incompatible in polyester systems such as those about which the present invention is concerned. For example, dyes of the following type have been found to spontaneously degrade excessively when they are held in molten poly-(ethylene terephthalate) for one hour at a temperature of 280°C (at the 500 ppm level)...1,4,5,8-tetraanilino anthraquinone...1,8-bis-cyclohexyl anthraquinone...

(Hunter Column 6, line 51 to Column 7, line 1, and Column 8, line 1, emphasis added). Thus, in view of Hunter, one of ordinary skill in the art would not be motivated to use 1,8-diaminoanthraquinone derivatives to color polyesters, let alone the particular polymers as claimed, because they would degrade at molding or processing temperatures.

Genta also fails to suggest or motivate a skilled artisan to use the instantly claimed 1,8-diaminoanthraquinone derivatives for dyeing the particular polymers of the claims. The Examiner alleged that Genta teaches that it is known to use anthraquinones with or without phenylsulfonyl groups in polymeric materials. Applicants respectfully point out that Genta does not teach the use of the particular 1,8-diaminoanthraquinone derivatives of the instant claims. Moreover, Genta teaches that many anthraquinones, which may or may not contain phenylsulfonyl groups, are no longer satisfactory due to increased requirements of excellent fastness, as Genta teaches:

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In recent years, various anthraquinones have been proposed for synthetic fibers, including the cellulose acetates and, most recently, the polyester family, particularly polyethylene terephthalate. *However, many of the compounds which heretofore had been found satisfactory for the dyeing of synthetic fibers, including polyesters, are no longer satisfactory due to the increased requirements of excellent fastness which have been brought about through the modern dyeing treatments.*

(Genta Column 1, lines 12-21, emphasis added). Therefore, one of ordinary skill in the art would not be motivated to use the instantly claimed 1,8-diaminoanthraquinone derivatives to dye the particular polymers of the instant claims in view of Genta, as these dyes would not be satisfactory due to the increased requirements of excellent fastness.

As Hunter and Genta fail to suggest the use of 1,8-diaminoanthraquinone derivatives to dye the particular polymers of the instant claims, the instant claims have not been rendered obvious over Hunter in view of Genta. Accordingly, reconsideration and removal of the 103 (a) rejections are respectfully requested.

Claim 32 has been amended to require the 1,8-diaminoanthraquinone derivatives to meet the stringent purity requirement of greater than or equal to about 90 wt%. For claim 32 and its dependent claims 33-36, it is the Applicants' contention that the combination of Hunter and Genta fail to render the claims obvious as Hunter and Genta, either alone or in combination, fail to disclose all elements of the instant invention; and further there is no suggestion or incentive that would have motivated the skilled artisan to modify or combine the references. The arguments previously made with regard to claim 1, which also requires the purity limitation for the 1,8-diaminoanthraquinone derivatives, are applicable to claim 32. Accordingly, reconsideration and removal of the rejection are respectfully requested.

Claims 1-26, 28-30, and 32-36 stand rejected under 35 U.S.C. § 103(a), as allegedly unpatentable over Smith (US 5,882,358) in view of the combined teachings of Orelup (US 4,735,631) and Genta (US 3,923,454). Applicants respectfully traverse this rejection.

Smith generally discloses automatic transmission fluid containing a red dye. The red dye is 1,5-diaminoanthraquinone, or the combination of 1,5-diaminoanthraquinone and 1,8-diaminoanthraquinone compounds. (Smith, Column 2, lines 10-33).

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Orelup generally discloses colored petroleum markers or tagging compounds that are 1,4-hydroxyanthraquinones which function as both dyes and markers (abstract). Orelup also discloses that "the compounds disclosed in the four previously listed patents (including certain 1,4-diaminoanthraquinones) have utility as hair dyes; dye-stuffs; blue dyes for polyester fibers; and pigments for transfer printing on polyesters, polyacrylonitriles or paper (Orelup, Column 3, lines 57-63).

The requirement for a determination of obviousness is that "both the suggestion and the expectation of success must be founded in the prior art, not in applicant's disclosure." *In re Dow Chem.*, 837 F.2d 469, 473, 5 U.S.P.Q.2d 1529, 1531 (Fed. Cir. 1988). An Examiner thus cannot base a determination of obviousness on what the skilled person in the art might try or find obvious to try. Rather, the proper test requires determining what the prior art would have led the skilled person to do, with a reasonable expectation of success. *In re Dow Chem.*, 837 F.2d 469, 473, 5 U.S.P.Q.2d 1529, 1531 (Fed. Cir. 1988).

Smith, Orelup, and Genta, alone or together, fail to provide any suggestion or motivation to combine these references to arrive at the instant claims, further there was no reasonable expectation of success for any proposed modification of the references. As presented above, Genta fails to teach or suggest the use of the particular 1,8-diaminoanthraquinone derivatives required by the instant claims. Smith discloses the use of 1,5-diaminoanthraquinones either alone or in combination with 1,8-diaminoanthraquinones in transmission fluid, but fails to teach or suggest the use of 1,8-diaminoanthraquinones alone, let alone for use in polymeric resins. Orelup discloses the use of 1,4-hydroxyanthraquinones as both dyes and markers in petroleum liquids. It fails to teach or suggest the use of 1,8-diaminoanthraquinones in polymeric resins.

There is no motivation to combine Genta with either Smith or Orelup. First, they are directed to different fields of art. While Genta is directed to polymeric dyeing, Smith and Orelup are directed to transmission fluid dyeing or petroleum tagging. Second, Genta does not teach the use of 1,8-diaminoanthraquinones free of a phenylsulfonyl group for dyeing thermoplastic polymers. Smith teaches that although 1,5-diaminoanthraquinones can be used alone for tagging transmission fluid, 1,8-diaminoanthraquinones is used as an adjunctive dye with 1,5-diaminoanthraquinones, but not alone. Smith does not discuss why 1,8-diaminoanthraquinones cannot be used alone. However, a

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skilled artisan in polymeric coloring would not be motivated to use an adjunctive dye used for transmission fluid coloration to color polymer resins absent any suggestions by the relevant art. Neither Genta nor Smith provides any suggestion for such a combination. Third, Orelup does not cure this deficiency as it does not teach the use of 1,8-diaminoanthraquinones. It does teach that certain 1,4-diaminoanthraquinones have been used as blue dyes for polyester fibers. However, different diaminoanthraquinone analogs have different properties and uses. For example, paragraph [0055] of the instant application also teaches that 1,8-anthraquinones and their 1,5- analogs have different absorbance ratios and the former is preferred over the later. Thus Genta, Smith, and Orelup do not provide any suggestion or motivation to combine 1,8-diaminoanthraquinones with the particular polymers of the instant claims.

Additionally, there is no expectation of success of combining Genta, Smith, and Orelup. Smith and Orelup are non-analogous art as they are directed to transmission fluid/petroleum coloration, whereas the instant invention is directed to coloring thermoplastic polymers. Coloring transmission fluid/petroleum liquids and thermoplastic polymers are very different as they involve different processes and conditions. For example, polymeric coloring often involves processing at high temperatures to fully incorporate the dye (see, Genta, processing to at least 550°F, Column 8, lines 25-44) and has higher requirements on colorants regarding heat stability and compatibility with polymers (see, e.g., Hunter, Column 1, lines 44-60). Thus a dye that finds successful use in coloring transmission fluid or other petroleum fluids would not give reasonable expectation of success for dyeing polymers.

The Examiner has stated that "Orelup was relied on for its teachings of anthraquinones as tagging materials, not specifically in transmission fluid" (Office Action dated 1/30/2006, page 5). However, for an obviousness rejection to be proper, there must be some suggestion or incentive that would have motivated the skilled artisan to modify a reference or combined references; and that the proposed modification of the prior art must have had a reasonable expectation of success, determined from the vantage point of the skilled artisan at the time the invention was made. *In re Fine*, 5 U.S.P.Q.2d 1596, 1598 (Fed. Cir. 1988). General teachings of the use of anthraquinones as tagging materials would not provide a suggestion or incentive to a skilled artisan to use a particular dye, the 1,8-diaminoanthraquinones in this case, to color the particular polymers of the instant claims.

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Orelup does disclose that certain 1,4-diaminoanthraquinones have been used as blue dyes for polyester fibers. However, as presented above, different anthraquinone analogs have different chemical structures and properties. For instance, 1,8-diaminoanthraquinones have better heat stability than the 1,5-derivatives (Paragraph [0040]) and different absorbance profile from the 1,5-analog. Thus, teaching of 1,4-diaminoanthraquinones in polyester fibers provides neither motivation nor expectation of success to use 1,8-diaminoanthraquinones to dye the particular polymers of the instant claims which do not include polyesters.

Furthermore, Applicants respectfully point out that the Examiner has used improper "hindsight reasoning" to reject the present claims under 35 U.S.C. §103 (a). When, as here, the §103 rejection was based on selective combination of the prior art references to allegedly render a subsequent invention obvious, "there must be some reason for the combination other than the hindsight gleaned from the invention itself." Stated in another way, "it is impermissible to use the claimed invention as an instruction manual or 'template' to piece together the teachings of the prior art so that the claimed invention is rendered obvious." *In re Fritch* 23 U.S.P.Q.2d 1780, 1784 (Fed. Cir. 1992).

Notwithstanding the above arguments, none of Smith, Orelup, and Genta teaches or suggests the required purity of the 1,8-diaminoanthraquinones as is required by independent claims 1 and 32, and including their dependent claims. The Examiner alleged that it would have been obvious to obtain the claimed purity of at least 90 wt% using the technique disclosed by Smith (Office Action dated 9/26/2005, page 6). Applicants respectfully disagree. Smith only discloses a method of obtaining 1,5-diaminoanthraquinones by removing any remaining inorganic salts from the reaction product at the end of the reaction process (Smith, Column 4, lines 13-28). It does not discuss removing inorganic salts from 1,8-diaminoanthraquinones reaction product. More importantly, the typical impurities of the 1,8-diaminoanthraquinones of the instant application are monohalogenatedanthraquinones and residual amine starting materials rather than inorganic salts. (Paragraph [0038]). Smith fails to teach techniques of removing these impurities. Since none of Smith, Orelup, and Genta teaches the particular purity of 90 wt% of 1,8-diaminoanthraquinones of the instant claims, a person skilled in the art would not be motivated to use this particular purity. Therefore, reconsideration and removal of the 103(a) rejections are respectfully requested.

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Claims 1-13, 16-26, 28-30, and 32-36 stand rejected under 35 U.S.C. § 103(a), as allegedly unpatentable over Turner et al (GB 985,970, hereinafter "Turner") in view of the combined teachings of Priester et al (US 4,655,970; hereinafter "Priester") and Genta (US 3,923,454). Applicants respectfully traverse this rejection.

Turner generally discloses certain 1,5- and 1,8-diaminoanthraquinones and their acid addition salts as active against infections of *Hymenolepis nana* in mice and *Oöchoristica symmetrica* in mice.

Priester generally discloses a process for the manufacture of quaternized diaminoanthraquinones by reacting alpha-nitro-anthraquinone with an amine to give 1-aminoanthraquinone (B), halogenating, preferably brominating the compound (B) to give 1-amino-4-halogeno- or 1-amino-2,4-dihalogeno-anthraquinone (C), condensing the compound (C) with a diamine or with an amine to give 1,4-diaminoanthraquinone (D) and subsequently quaternizing compound (D) to give the corresponding quaternized anthraquinone compound (E). No 1,8-diaminoanthraquinones are disclosed, only 1,4-diaminoanthraquinone.

One of ordinary skill in the art would not be motivated to combine the teachings of Turner, Priester, and Genta to arrive at the instant invention as Turner is directed to treating infections of *Hymenolepis nana* and *Oöchoristica symmetrica* in mice, and not for the dyeing of polyester materials or coloration of rigid plastic materials like Genta. It is basically nonanalogous art.

The Examiner alleged that Turner "also teaches that its compounds give off some color" (Office Action dated 1/30/2006, page 5). Applicants respectfully point out that this teaching is merely a description of the physical property of the obtained 1,5-diaminoanthraquinone (Turner, page 2, lines 25-36). It does not in any way teach the use of 1,8-diaminoanthraquinone as a colorant for thermoplastic polymers. Many substances give off color, but only a small portion of colored materials can be used as dyes, especially for coloring certain particular polymers of the instant claims. Since Turner does not teach the use of 1,8-diaminoanthraquinones for use as dyes, there is no suggestion to combine this reference with Genta or Priester.

Although Priester discloses quaternized forms of 1,4- diaminoanthraquinones which can be used as cationic dyes, it fails to teach or suggest 1,8-diaminoanthraquinone for coloring

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thermoplastic polymers. As presented above, different diaminoanthraquinone analogs have different properties and uses. General teaching of 1,4-diaminoanthraquinones and 1,5-diaminoanthraquinones for uses other than polymeric dyeing does not provide any motivation to use 1,8-diaminoanthraquinones for coloring the particular polymers of the instant claims.

Therefore, Applications respectfully request reconsideration and removal of the rejections to claims 1-13, 16-26, 28-30, and 32-36.

Claims 27 and 31 stand rejected under 35 U.S.C. § 103(a), as allegedly unpatentable over Smith in view of the combined teachings of Orelup and Genta or Turner in view of the combined teachings of Priester and Genta, either of which and further in view of U.S. Patent No. 5,747,632 to Adachi et al. ("Adachi"). Applicants respectfully disagree.

Adachi generally discloses polycarbonate resin with high flowability having a viscosity average molecular weight (Mv) of 13,000 to 20,000 and containing below 1% by weight of low molecular weight carbonate compounds having the range of molecular weight 1,000 or below and at least 10% by weight of a polycarbonate oligomer having the range of molecular weight 2,000 to 5,000.

Claims 27 and 31 are both ultimately dependent upon independent claim 1. For reasons discussed above, claim 1 has not been rendered obvious over Smith, Orelup, and Genta, or Turner, Priester, and Genta. Adachi only provides a teaching as to the molecular weight of a particular polycarbonate. Adachi does not provide the necessary teaching or suggestion that is lacking in the cited references sufficient to render claim 1 obvious. Accordingly, reconsideration and removal of the rejections are respectfully requested.

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It is believed that the remarks fully comply with the Office Action and that the claims herein should now be allowable to Applicants. Accordingly, reconsideration and allowance are requested.

If there are any additional charges with respect to this Amendment or otherwise, please charge them to Deposit Account No. 07-0893.

Respectfully submitted,

CANTOR COLBURN LLP

By


Roberta L. Pelletier

Registration No. 46,372

Date: March 23, 2006
CANTOR COLBURN LLP
55 Griffin Road South
Bloomfield, CT 06002
Telephone (860) 286-2929
Facsimile (860) 286-0115
Customer No.: 43248